

CLAIMS

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is as follows:

- 1 1. A fiber optic transducer for measuring shear
2 force or flow rate comprising
3 a floating head,
4 a reference surface,
5 a cantilever means extending between said
6 reference surface and said floating head, and
7 a plurality of integral fiber optic sensors
8 arranged to sense relative motion between said
9 reference surface and said floating head, each said
10 integral fiber optic sensor comprising
11 a tube,
12 a fiber optic element having an end
13 within said tube, and
14 a reflective surface positioned by
15 said tube at a location spaced from said
16 end of said fiber optic element by said
17 tube.
- 1 2. The transducer as recited in claim 1 wherein
2 said plurality of integral fiber optic sensors are
3 symmetrically arranged around said cantilever.
- 1 3. The transducer as recited in claim 2 wherein
2 said plurality of integral fiber optic sensors
3 comprise two integral fiber optic sensors.

1 4. The transducer as recited in claim 1 wherein
2 said plurality of integral fiber optic sensors
3 comprise two integral fiber optic sensors.

1 5. The transducer as recited in claim 1 wherein
2 some of said plurality of integral fiber optic
3 sensors are bonded to said cantilever means.

1 6. The transducer as recited in claim 1 wherein
2 said reflective surface is formed by an end of an
3 optical fiber.

1 7. The transducer as recited in claim 1 wherein
2 said end of said optical fiber is substantially
3 flat.

1 8. The transducer as recited in claim 1, further
2 including
3 a housing surrounding said cantilever means and
4 said plurality of integral sensors.

1 9. The transducer as recited in claim 8, wherein
2 said housing includes a bellows sealed to said
3 floating head.

1 10. The transducer as recited in claim 9 wherein
2 said bellows further includes a spring.

1 11. The transducer as recited in claim 1 wherein
2 said cantilever means is formed of an alloy.

1 12. The transducer as recited in claim 1 wherein at
2 least two of said integral sensors are matched for
3 responses to temperature and pressure.

1 13. The transducer as recited in claim 1 wherein at
2 least two of said plurality of integral sensors are
3 substantially insensitive to temperature variation.

1 14. The transducer as recited in claim 1 wherein an
2 integral sensor of said plurality of integral
3 sensors includes a plurality of gaps.

1 15. A flow rate or shear force telemetry system
2 including
3 a fiber optic transducer for measuring shear
4 force or flow rate comprising
5 a floating head,
6 a reference surface,
7 a cantilever means extending between said
8 reference surface and said floating head, and
9 a plurality of integral fiber optic sensors
10 arranged to sense relative motion between said
11 reference surface and said floating head, each said
12 integral fiber optic sensor comprising
13 a tube,
14 a fiber optic element having an end
15 within said tube, and
16 a reflective surface positioned by
17 said tube at a location spaced from said
18 end of said fiber optic element by said
19 tube, and
20 signal processing means including common mode
21 signal rejection processing.